

English, Français (et Canada)

Effective 8/15

This instruction manual is for use by an authorized service technician to install an Atwood – *hydro flame™* furnace. Should you require further information, contact your dealer or Atwood Mobile Products LLC.

This furnace design has been certified for installation in recreation vehicles as a MSP Category III furnace. Follow this installation instruction to insure safe operation of the furnace. Failure to install furnace according to this installation instruction nullifies the furnace warranty.

TO THE INSTALLER: LEAVE THIS MANUAL WITH THE APPLIANCE.

TO THE CONSUMER: RETAIN THIS MANUAL FOR FUTURE REFERENCE.

SAFETY ALERT SYMBOLS

Safety Symbols alerting you to potential personal safety hazards obey all safety messages following these symbols



WARNING

Avoid possible injury or death



CAUTION

Avoid possible injury and/or property damage



WARNING FIRE OR EXPLOSION

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

- Extinguish any open flame.
- Evacuate all persons from the vehicle.
- Shut off the gas supply at the gas container or source.
- Do not touch any electrical switch, or use any phone or radio in the vehicle.
- Do not start the vehicle's engine or electric generator.
- Contact the nearest gas supplier or qualified service technician for repairs.
- If you cannot reach a gas supplier or qualified service technician, contact the nearest fire department.
- Do not turn on the gas supply until the gas leak(s) has been repaired.

A qualified Service Technician
 Service Center or gas supplier must perform
 installation and service.



WARNING

Installation of this appliance must be made in accordance with the written instructions provided in this manual. No agent, representative or employee of Atwood or other person has the authority to change, modify or waive and provision of the instructions contained in this manual.



WARNING

Avoid possible injury or death

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Refer to the installation instructions and/or owner's manual provided with this appliance. A qualified installer, service agency or the gas supplier must perform installation and service.



FOR YOUR SAFETY

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.



WARNING

Be sure the furnace and all ignition systems are "off" during any type of refueling and while vehicle is in motion or being towed.



CRITICAL INSTALLATION WARNINGS

- DO NOT install furnace on material that restricts return air, like carpet or any soft material such as vinyl.
- DO NOT install furnace where clearance to combustibles cannot be maintained.
- DO NOT modify furnace or intake and exhaust vent in any way.
- DO NOT alter furnace for a positive grounding system.
- DO NOT hi pot furnace unless electronic ignition system (circuit board) has been disconnected.
- DO NOT use battery charger to supply power to DC model furnace even when testing.
- DO NOT use 120-volt AC current with DC models.
- DO NOT use furnace cabinet area as a storage compartment.
- DO NOT vent furnace with venting system serving another appliance.
- DO NOT vent furnace to an outside enclosed porch area.
- DO NOT use for temporary heating of buildings or structures under construction.
- Protect building materials from degrading from flue gas exhaust.
- Protect furnace electrical components from water.
- Compartment must be closed when operating unit.
- Should the gas supply fail to shut off or if overheating occurs, shut off the gas valve to the furnace before shutting off the electrical supply.
- DO NOT use this furnace if any part has been under water.
- DO NOT use petroleum or citrus type cleaner on plastic parts, as damage may occur.

CAUTION
PERSONAL INJURY

All sheet metal edges are sharp care should be taken when handling or brushing up against them.

WARNING
CARBON MONOXIDE POISONING

Properly seal vent assembly to prevent carbon monoxide from entering coach.

- DO NOT draw combustion air from living area.
- DO NOT vent exhaust air into the living area or an enclosed porch.

WARNING
CARBON MONOXIDE POISONING

- Furnace must be installed and vented to these instructions.
 - Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.
- Improper installation location may cause furnace to produce negative pressure, affecting combustion air or venting of other appliances.

WARNING
CARBON MONOXIDE POISONING

- Properly seal door to prevent carbon monoxide from entering coach.
- Properly adjust draft cap to prevent carbon monoxide from entering coach.

MODEL NOMENCLATURE

AF	M	D	25	1	1	1	A
Atwood Furnace	Cabinet Size	Voltage	Input Btu/hr	Gas Type	Style	Valve	Model Rev
AF	L=large	D=12 VDC	35K	1=LP	1=door	1=Single	A
		A=120 VAC	40K	2=LP/NAT	2=LD (small vent)		
					3=door w/ rear gas fitting		
					4=door w/pigtail		
					5=door w/pigtail rear gas fitting		

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MODEL SPECIFICATIONS

Models	AFLD35	AFLD40	AFLD35	AFLD40
BTU Input	35,000	40,000	35,000	40,000
Duct Static Pressure	.10" WC	.10" WC	.10" WC	.10" WC
Amperage (AMPS)	12.5*	12.5*	2.5	2.5
Watts	138	138	154	154
Power Supply	12VDC	12VDC	120VAC	120VAC
Recommended Return Air	80 in ²	80 in ²	80 in ²	80 in ²
Minimum Hard Duct Return Air	65 in ²	65 in ²	65 in ²	65 in ²
Minimum Discharge Air	48 in ²	48 in ²	48 in ²	48 in ²
Type of Gas	Propane LP	Propane LP	Propane LP & Natural Gas	Propane LP & Natural Gas

(WC = WATER COLUMN)

* 20 AMP DECATATED CIRCUIT TO THE FURNACE

DIMENSIONS

All Models	Width	Height	Depth	Weight
Casing	16-1/2"	9"	20"	Furnace 39 lbs
Door	19-1/4"	9-1/4"	1/4"	
Recess Bezel	20-9/16"	11-1/2"	3/8"	Boxed 46 lbs
LD Vent	5"	5-3/8"	1"	

INSTALLATION AND SAFETY CODES

- USA and Canada – follow all applicable state and local codes in the absence of local codes or regulations, refer to current standards of:
- ANSI/NFPA 1192 Recreational Vehicles Code and ANSI/RVIA LV Low Voltage Systems in Conversion and Recreational Vehicles
- CSA Z240.4, Gas-Equipped Recreational Vehicles and Mobile Housing
- National Fuel Gas Code ANSI Z223.1 and/or CAN/CGA B149
- This furnace must be installed in accordance with the manufacturer's instructions and the manufactured Home Construction and Safety Standard, Title 24 CFR, part 3280, or

when such standard is not applicable, the Standard for Manufactured Home Installations. (Manufactured Home Sites, Communities and Set-Ups), ANSI A255.1 and/or CAN/CSA-Z240 MH Series M92 Canadian Standard for Mobile Homes."

- ANSI A 255.1 and/or CAN/CSA-Z240.6.2 MH Series, Mobile Homes
- Ground National Electrical Code ANSI/NFPA 70 and/or CSA C22.1, Part 1
- Park Trailers ANSI 1195

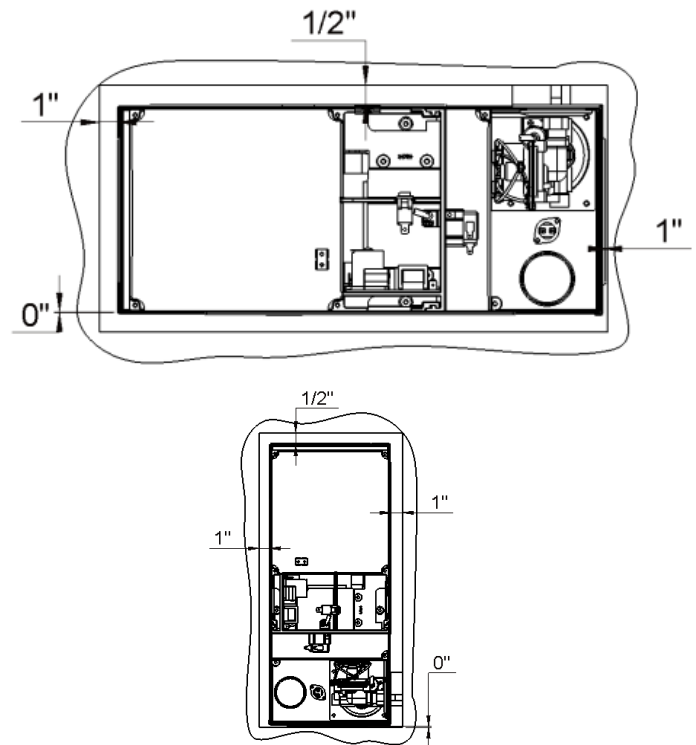
GENERAL FURNACE INSTALLATIONS

- All models can be installed in either a horizontal or vertical mounting position horizontal installed units have the gas line positioned on top or rear, vertical installed units have the must have the vent located at the floor and gas line at right side and rear.
- Always install furnace through an exterior wall.
- DO NOT install furnace near tilt-out rooms, slide-outs, doors or other projection that could obstruct furnace exhaust.
- Locate furnace near midpoint of coach for single furnace applications.
- Installation must provide accessibility if any repairs are necessary to the furnace. Failure to meet this requirement will create additional labor costs that will be the responsibility of the installer.
- DO NOT install vent in areas where projection or door openings come within 6" of vent opening.
- DO NOT install furnace in an area where wires, pipes or other objects will interfere with installation or operation of furnace.
- DO NOT install furnace on material that restricts return air, such as directly on carpet, or soft material (like vinyl). If you must install furnace on carpet or soft material, install furnace on cleats, or on a wood or metal panel extending the full width and depth of furnace plus minimum clearance to combustibles.
- DO NOT use petroleum or citrus type cleaner on plastic parts, as damage may occur.
- CAUTION: Due to the differences in vinyl siding materials this appliance should not be installed without first consulting with the manufacturer of siding.
- A gas-fired furnace for installation in a residential garage must be installed so the burner(s) and the ignition source are located not less than 18 in (457mm) above the floor and the furnace must be located or protected to avoid physical damage by vehicles.
- DO NOT use petroleum or citrus type cleaner on plastic parts, as damage may occur.

CLEARANCE TO COMBUSTIBLES

Floorboards, walls & similar combustible building materials must be provided the full length and width of unit. Spacing is based on installed position when installed horizontally bottom is bottom. When installed vertically bottom becomes right side.

clearances	Top	Sides	Rear	Bottom (to screw heads)	Blower (side opening)
Vertical / Horizontal	1/2"	1"	1/2"	0"	36 sq. in.



- Spacing of 1/4" to ducting within 3 feet of furnace must be provided unless UL listed wire bound vinyl ducts are used. All ducting material used to be rated for continuous use at minimum of 200°F.
- Clearances are specifically for plywood or similar building materials surrounding the furnace (i.e. Furnace should not be located under furniture or in a closet space where clothing or other material could be located).
- To install without adding the 36 sq. in. cutout on the blower side supply the right side of unit (blower side) with 2" clearance full length of the unit
- Furnace efficiency rating is a thermal rating determined under continuous operating conditions, independent of any installation. Efficiency rate is given at 76% minimum; actual efficiency rating may be higher.
- Return air is supplied through openings in furnace casing. All return air passages must be kept clear for furnace to function properly. Refer to Minimum clearance to floorboards, walls & similar combustible building material.
- The total unobstructed return air opening size(s) must not be less than specified. Failure to meet minimum return air requirements nullifies furnace warranty.

REQUIRED DUCTING

All ducts in the table are four-inch ducts except for bottom discharge as noted. Two-inch ducts cannot be used in place of four inch. A bottom discharge requires no additional ducting; additional ducts can be added if required. Vertically installed units can also be bottom discharge when right side cover panel has been removed additional duct can be added if required.

FOR OPTIMAL PERFORMANCE: Use the following ducting recommendations. Top Duct is used only in addition to these requirements and is not allowed to be used until these requirements are met. Additional ducting when added will reduce the airflow through the ducting and improper ducting could cause poor heating and or cycling on high temperature limit.

Horizontal or Vertical 4" Ducting: when using 4" ducting one duct from each side must be used. When using side ducts rear duct openings will give the best performance.

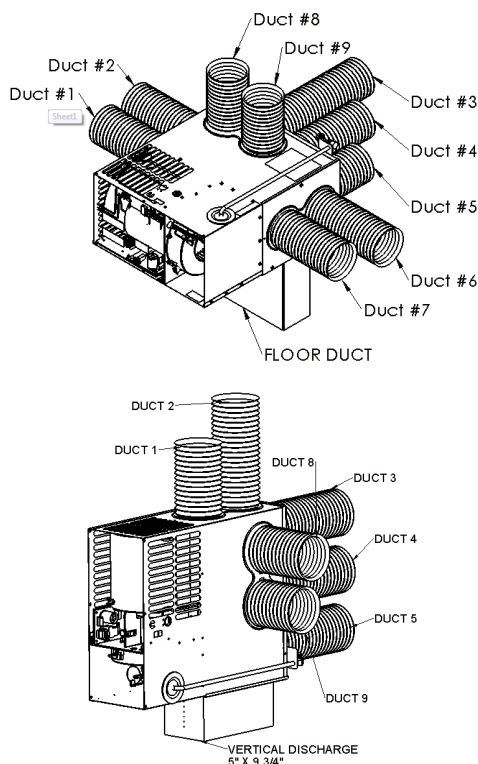
- **Horizontal Bottom Discharge:** This installation is for horizontally installed units and can be used with the addition of one duct any location except the top two.
- **Vertical Bottom Discharge:** Installation of the furnace in a vertical mounting position can be used with the addition of one duct any location except the top two.

REQUIRED DISCHARGE

Models	Required Discharge Area
AFL (35)(40)	36 in ²
Horizontal Bottom	48 in ²
Vertical Bottom	48 in ²

System	AFLD35	AFLD40	AFLA35	AFLA40
4" Duct	3	3	3	3
Bottom plus 4" duct min	4x10	4x10	4x10	4x10
Vertical Bottom	5x9-3/4	5x9-3/4	5x9-3/4	5x9-3/4

***Note the table is for minimum requirements and should in most cases allow the unit to operate correctly. If the burner cycles on and off on high temperature limit. Extra ducting can be used to help correct this condition due to restriction or bends in duct work.**



- Proper duct installation is critical to operation of furnace. When installing ducts, use materials rated for continuous use at 200°F.
- Each 4-inch duct opening provides 12 in² of discharge area. Provide an extra 12 in² of non-closeable duct discharge area for each closeable register used.
- Ducting into dead air space with no return air, such as holding tank areas, does not count toward achieving minimum discharge requirements.
- Adjust ducting installation to obtain air rise of 100°F-130°F. Also see air flow check section.

FLEXIBLE DUCTING

When designing flexible duct systems:

- Follow ducting configuration shown
- Avoid sharp bends or crushed ducts.
- Stretch all ducts and run them directly to outlets, keeping quantity and angles of bends to a minimum.
- Remove knockout plate from desired outlets. If a knockout is removed accidentally a cover plate can be purchased.
- Attach a duct adapter by inserting flange over casing hole, locking the tab into casing slot and turning adapter 90°.
- Attach and secure four-inch flexible duct to adapter(s).
- Run duct(s) to desired location within RV, secure to register(s).

AIR FLOW CHECK

- Appliance is tested to a temperature rise as specified on the Rating Plate. After installation of the furnace and duct system is completed, adjustment to obtain a temperature rise should be made.
- The table below is a reference to maintain maximum operation of the appliance when checking temperature rise is not possible. Airflow measurements made at each registers the total reading should not be less than what is shown in table below for each BTU size.
- If readings are below the table values airflow can be improved by adding ducts or reduce restrictions in the system.

35-40 DC	35-40 AC
4600 fpm	5000 fpm

Total fpm= feet per minute readings

FURNACE INSTALLATION

- The furnace should always be installed level (front to back, side to side) to prevent water intrusion into the interior.
- Set aside venting and outer door parts for installing on the outside of coach.
- NOTE to assure sufficient return air to circulating blower maintain specified clearances.
- If units are installed using the small outside vent system access to the inside of the coach must be provided directly in front of the unit to remove for service suggested opening size 17" wide by 9-1/2" height.
- Remove knockouts from furnace and install duct adapters for side discharge by inserting back flange over casing and inserting tab into square notch, then twist adapter 90°.
- Insert furnace into cabinet opening and secure with two screws through casing legs to floor. Units are secured by door or vent systems through the coach sidewall.
- Attach flexible ducting over duct adapters and secure. All flex ducting requires rating of 200°F.
- Run ducting to locations keeping bends and excess ducting to a minimum and secure to registers.
- Connect wiring to located on the top of the furnace. See wiring connection section.
- Connect gas line to top or rear of furnace. See gas connection section.

SIDEWALL CUTOUT

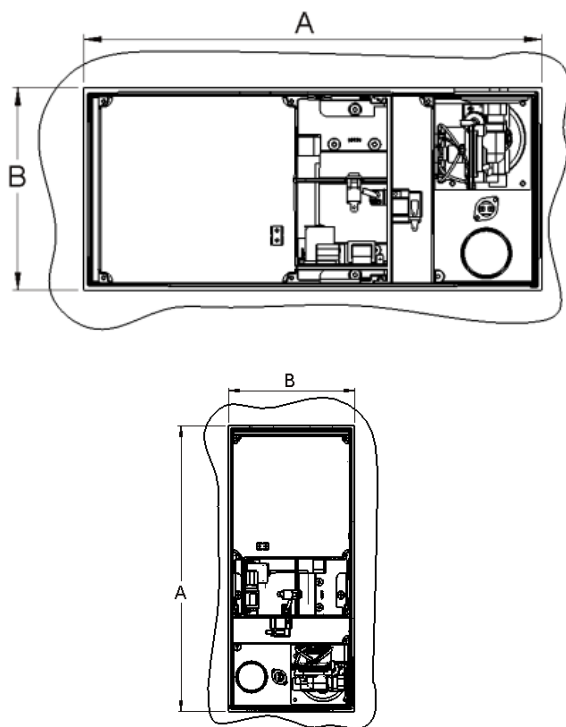
Maximum exterior wall thickness 0" to 2-1/2" an optional vent kit can be purchased to extend the vent usage to 3" wall thickness for small vent installations

WALL CUTOUT

(Flush Door requires 3/4" radius corners)

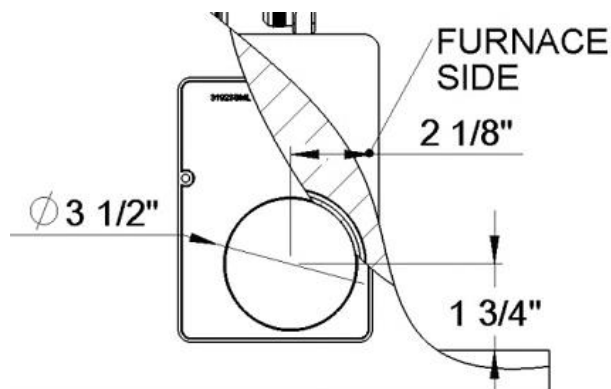
	A	B	C
Flush Door (corner cut requires 3/4" radius) (horizontal or vertical)	18-1/4"	11 1/8"	20"

- DO NOT oversize hole – over sizing can result in water leakage.
- Zero clearance around air intake cutout for best sealing condition.



SMALL VENT INSTALLATION

- To prevent moisture from entering inside of coach, apply RTV type sealant to the back of the bezel flange of the vent part.
- Vents are designed to allow water drainage when installed correctly.

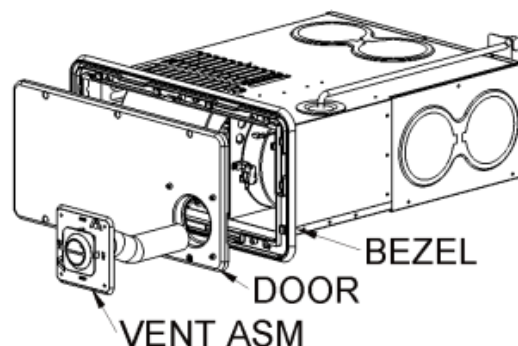


1. Locate where furnace vent cutout will be made.
2. Drill 3-1/2" diameter hole through sidewall of coach.
3. Insert furnace from inside of coach, lining up hole in wall with vent in furnace.
4. Apply sealant to back of vent panel extension (plastic part).
5. Install vent assembly, vent panel extension must be inserted into air intake tube. Secure vent to wall with 4 screws provided. Vent assembly must maintain overlaps of 1-1/4" on exhaust tube and 1/2" on air tube. DO NOT exceed maximum wall thickness.
6. Secure furnace to floor with legs and screws (equivalent type screws can also be used) provided at back of casing. For vertical units casing legs can be positioned for placement to secure furnace

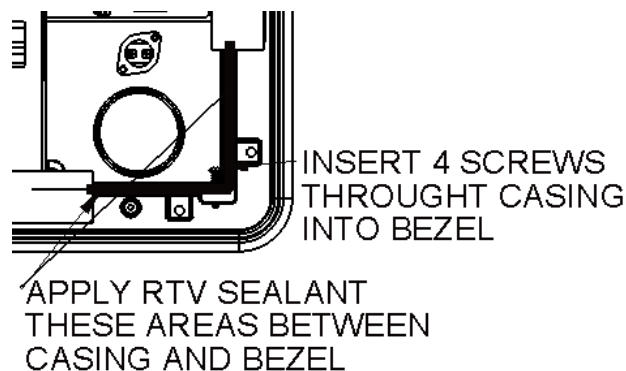
FLUSH DOOR INSTALLATION

- To prevent moisture from entering inside of coach, apply RTV type sealant to all sealing areas.
- The door bezel must fit tightly, to prevent water leakage.

- Doors are designed to allow water drainage in either horizontal or vertical installations. Proper location of vent assembly is important for proper exhausting of fumes and proper function of furnace.
- NOTE:** RTV type sealant must be applied to the bezel and casing at the bottom right side to prevent possible water wicking into the coach. See drawing for areas that must be sealed once bezel is in place.



1. Locate and cut-hole location in side wall where unit will be installed.
2. Flush mounted doors system requires that the furnace be installed on a 1" high platform for the door cutout to be level with the floor surface. If not the sidewall can be routed out across the bottom to the depth of the bezel to create a pocket area.
3. Apply RTV type sealant to entire back flange of bezel creating a seal area.
4. Secure bezel by inserting bezel into wall cutout and securing through the 10 mounting tabs to the side wall framing. Make sure that the bezel is tight against the side wall.
5. Connect the gas line to the valve and push the gas line plug into casing opening.
6. The door bezel must fit tightly against sidewall to prevent water leakage.
7. Remove excess sealant from around bezel and visually inspect bezel to make sure it is completely sealed.
8. Secure furnace with mounting legs provided.
9. Fasten door and vent with 6 screws provided



Use of foil tape as alternate sealing method is acceptable



HARD DUCTING SYSTEMS

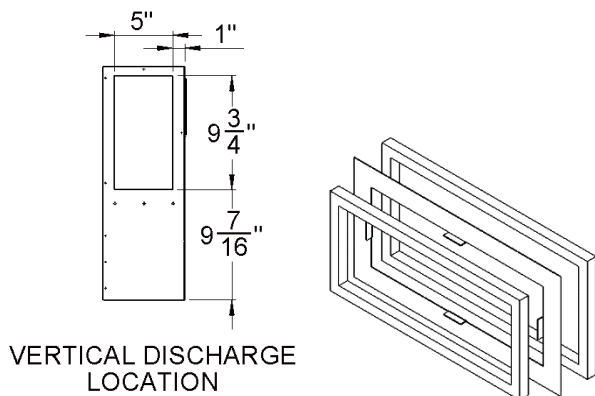
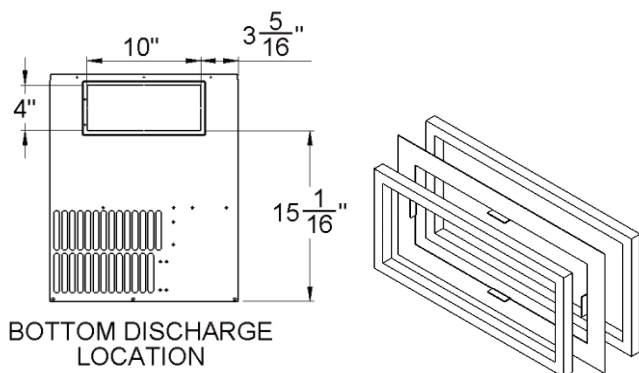
When designing hard ducting systems:

- Undersize ducting will cause high temperature limiting.
- Oversize ducting will cause inadequate air flow from registers
- When hard ducting is less than 1-1/2" in depth additional flex ducting may be needed to maintain static pressure requirements.

- DO NOT install floor registers within 2 feet of return air openings. See ducting option from casing top and bottom areas. Hard ducting must be sealed to the furnace and floor to insure proper operation of the appliance.
- Units can be installed as bottom discharge systems in either horizontal or vertical position.

HORIZONTAL FLOOR DISCHARGE CUTOUT

1. Remove bottom discharge plate, this ducting option must be connected to a floor ducting system.
2. The drawing shows the use of a gasket (F) and plenum plate (E) for attaching furnace to the flooring. See parts list for order number.
3. Other methods of sealing furnace to the floor are acceptable as long as clearances and seals meet requirements of clearances and temperature.
4. Fasten plenum plate bend tabs over floor cutout. (If a gasket and plenum plate is not used seal furnace to hard ducting system with approved tape making sure seal is airtight) Continue with step 5.
5. Position gasket on plenum over opening.
6. Set furnace on gasket; make sure gasket remains in position.
7. Additional flex ducting can also be used to maintain correct static pressure.



WARNING **FIRE OR EXPLOSION**

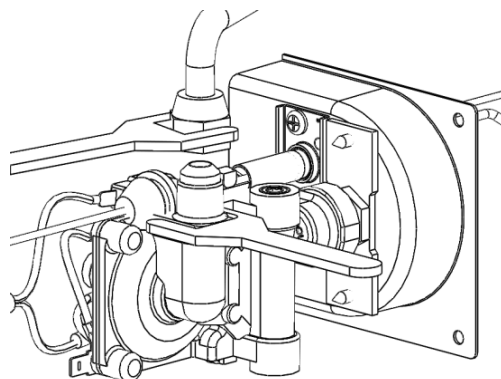
Never check for leaks with an open flame. Turn on the gas and apply soapy water to all joints to see if bubbles are formed.

GAS CONNECTION

Gas Pressure Test

- The furnace and any individual shut-off valve must be disconnected from gas supply piping system during and pressure testing of system at test pressures of more than 1 1/2" PSI.

- Before furnace is, connected piping systems are to be tested to be leak free. The test must maintain air pressure of a least 6" of mercury or 3 PSI for at least 10 minutes.
- The entire piping system is to be adjusted to maintained a pressure of 10" to 13" W.C. when all appliances are in operation.
- Test gas connections for leakage with soapy water or a leak test solution.
- If local codes allow the use of a flexible gas appliance connector, always use a new listed connector. Do not use a connector, which has previously serviced another gas appliance.



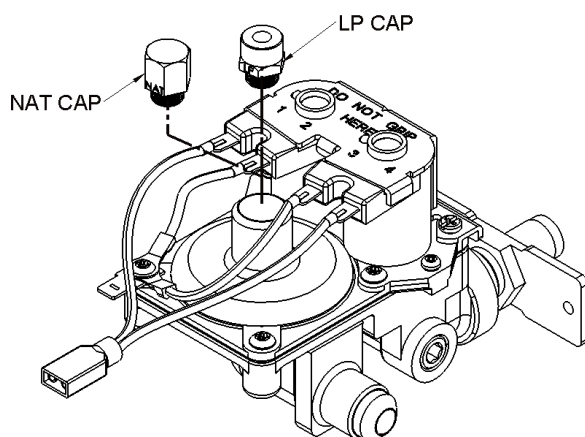
1. Connect gas line to the fitting located on the valve through hole in top of casing or if supplied with an extended manifold at the rear of the furnace.
2. Be sure all male pipe threads, other than flare fittings, are treated with a sealing compound resistant to the action of propane (LP) gas. DO NOT put sealing compound on flare fittings
3. Remove grommet plug from furnace. After inserting gas line through gas plug and connecting to valve re-install gas plug this is a required air seal.
4. Insert gas line through grommet plug (DO NOT CUT).
5. Connect gas line inside furnace casing immediately ahead of gas control valve or at the rear when extended manifold is supplied.
6. Use two wrenches to hold brass fitting and flare nut when tightening gas line to brass fitting. DO NOT twist valve assembly. DO NOT twist valve assembly, torque fitting to 20-22 ft. lbs.

CONVERTIBLE GAS CONTROL

- AC model units come equipped with a convertible gas control.
- Each unit is supplied with two main burner orifices. One will be in place; the other will be attached to the blower housing cover.
- Each orifice will be clearly marked with a drill size as shown below.
- The pressure settings of the convertible valve are set for natural gas NAT 3.5" WC or LP 10.5" WC and are not adjustable.
- Use Loctite* #RC609 or some other thread lock sealant on orifice threads when installing a new orifice.
- A 1/8" NPT plug is provided upstream of gas connections for checking gas pressure.

GAS TYPE	BTU/HR	LINE PRESSURE	REG. PLUG SETTING	DRILL SIZE
Propane (LP)	40,000	11" WC	10.5" WC	49P
Natural (Nat)	40,000	7" WC	3.5" WC	#30
Propane (LP)	35,000	11" WC	10.5 WC	#51
Natural (Nat)	35,000	7" WC	3.5" WC	#30

*WC= Water Column



VALVE CONVERSION

- See drawing to check which plug to use marking is on side of adjustment reg. plugs. Furnace come with LP plug installed and the natural plug in the bag with the natural gas orifice. NAT or LP is stamped on the side. The type of gas being used must match the plug and orifice in use when installed.
- Unscrew plug and remove from valve reg. tower. DO NOT remove rod from inside the reg. tower or make any adjustments.
- When set for LP and NAT is required:
Unscrew plug and replace the correct plug into tower for NAT.
NAT should now be visible.
Finger tighten plug or with small wrench. DON'T over tighten.
 - When set for NAT and LP is required:
Unscrew plug and replace plug with the correct plug into tower for LP.
LP should now be visible.
Finger tighten plug or with small wrench. DON'T over tighten.
- This plug has been factory calibrated for this valve only. DO NOT modify and DO NOT use plug on any other valve.
- Install the correct main burner orifice per the chart.

ORIFICE REPLACEMENT

- Remove gas line from valve.
- Remove burner assembly by removing 3 screws from back wall of control box.
- Remove two screws holding the burner to the manifold.
- Unscrew the orifice with a 7/16" wrench or socket and replace with the correct orifice per the chart corresponding to type of gas required, which corresponds to the regulator plug setting.
- Replace two screws holding burner to manifold.
- Reinstall the burner assembly and put the three screws back into the control wall.
- Replace the gas line and check for leaks.
- After converting furnace, IN PLAIN SIGHT, put "converted" sticker (provided in you conversion packet) next to model number label.

ELECTRICAL CONNECTIONS

WARNING **INJURY OR PROPERTY DAMAGE**

- Label all wires before disconnecting for service. Wiring errors can cause improper and dangerous operation.
- Verify proper operation after serving.
- Disconnect electrical power before servicing.

CAUTION **PROPERTY DAMAGE**

On units with 12 volt connection are for low-voltage battery or direct current only.
Do not connect to 120 or 240 volts AC.

CAUTION **PROPERTY DAMAGE**

This furnace is designed for negative ground 12 volts DC only. DO NOT attempt to alter furnace for a positive ground system or connect the furnace directly to 120 OR 240 volts AC.

INSTALLATION AND SAFETY CODES

- USA and Canada – follow all applicable state and local codes in the absence of local codes or regulations, refer to current standards of:
- ANSI/NFPA 1192 Recreational Vehicles Code and ANSI/RVIA LV Low Voltage Systems in Conversion and Recreational Vehicles

12 VOLT DC WIRING

- Label all wires before disconnecting for servicing. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.
- Disconnect electrical power before servicing.

Conductor Sizing – Maximum 10% Voltage Drop – (12VDC)

Table 1

OVERCURRENT PROTECTION (No Wire Bundling Restrictions)

Wire Size	Ampacity	Wire Type
20	3	Stranded only
18	6	Stranded only
16	8	Stranded only
14	15	Stranded only
12	20	Stranded only
10	30	Stranded only
8	40	Stranded only
6	55	Stranded only
4	75	Stranded only
2	100	Stranded only

Table 2

OVERCURRENT PROTECTION

*Not More Than Seven Wires Per Harness

**Not More Than Three Wires Per Harness

AWG OR SAE Conductor Size (Gage)	Maximum Ampacity at Conductor Insulation Temperature Rating of 90°	Maximum Ampacity at Conductor Insulation Temperature Rating of: 105° C/125° C
20*	5	7.5
18*	7.5	10
16*	10	15
14*	17.5	20
12*	22.5	25
10**	40	50
8**	55	70
6**	75	100
4**	95	120
2**	130	150
1**	150	
1/0**	170	
2/0**	195	
3/0**	225	
4/0**	260	

- This furnace is designed for negative ground 12 volts DC only. DO NOT attempt to alter furnace for a positive ground system or connect the furnace directly to 120 volts AC. Damage to furnace components will occur and warranty will be voided.
- Use the minimum wire size show in the table above to minimize voltage drop. Furnace must be installed so electrical components are protected from water. To make electrical connections see attached wiring diagram specific to furnace model.
- For best furnace performance when power supply is from a converter equipped with a charging port, wire converter to furnace parallel with battery. This provides consistent voltage to furnace, increasing component life, filtering power surges and AC spikes.
- Some models are shipped with a field harness connections with 12" wire leads. An optional field harness with a double end is available in bulk. This harness contains 12" leads, four-pin housing, and standard six-pin housing.
- All units are supplied with a power switch which when turned off during servicing will remove power through furnace wiring. Switch must be on in the ON position for furnace to operate.
- The direct high voltage spark ignition generates a radio frequency that could cause interference with other microprocessor-based equipment. Locate equipment at least five feet (5') from furnace location. If this distance cannot be maintained, Atwood has a kit which can be purchased. See parts list.

Route wiring to the furnace.

Furnace	Power Supply
Red Wire +12 Volt DC	+12 Volt DC
Black Wire -12 Volt DC	-12 Volts (Ground)
Blue Thermostat +12VDC	+12 Volts (Thermostat)
Blue Thermostat	-12 Volts (Thermostat)

1. Wiring for thermostat using 22 minimum AWG stranded wire.
2. All wiring must be installed so the electrical components and connection are protected from water.
3. If a unit is supplied with a connector block on the field connections the mating parts should be used.

Furnace Connector	Field Connector
AMP 1-480705-0	AMP 1-480704-0
Furnace Terminals	Field Terminals
AMP 7708496	AMP 770020-1

120 VOLT AC WIRING

- Furnaces are equipped with a 120 volts AC motor. All other electrical component parts are supplied with power from a transformer inside the furnace at 24 volts AC.
- A 120 Volt model can also be supplied with a 30 inch power cord from the factory supplied with a molded plug with ground pin.
- AC units have a power switch located in the valve circuit leg only. This switch will not remove the power from the 120 volts incoming line. Make sure that power has been turned off before servicing.
- Switch must be in the "ON" position for the furnace to operate the valve.

CAUTION PROPERTY DAMAGE

This furnace is designed for 120 volts AC only. DO NOT attempt to alter furnace system or connect to 12 volts DC.

Route 120 volts AC and thermostat leads to wires located on the left side of control box using a minimum of 18 GA wire. The furnace must be installed so electrical components are protected from water. To make electrical connections see wiring diagram.

1. Route wiring to left side of furnace.
2. Remove junction box cover (some units come with pre-wired cords for connection directly to a 120 volts AC outlet).
3. Connect 120 white wire to furnace 120 white wire.
4. Connect 120 black wire to furnace 120 black wire.

5. Connect ground wire to furnace green ground wire (after connections are made put wire connections into furnace junction box and replace cover).
6. Connect thermostat leads to the two blue furnace thermostat leads using minimum 22-18 GA stranded wire.

THERMOSTAT INSTALLATION

- Purchase a thermostat rated for 12 VDC or 24 VAC, Minimum 1 AMP rating.
 - Be sure all electrical power to the furnace is disconnected.
 - The thermostats are very sensitive, HANDLE WITH CARE AT ALL TIMES.
1. Pick a dry area where air circulation is good.
 2. Do not install the thermostat where there are unusual heating conditions: such as direct sunlight, heat producing appliances (television, radio, wall lamp, etc.) or a furnace or air conditioner output registers.
 3. Locate thermostat 48" to 54" above main living area floor on an INTERIOR wall when possible
 4. EXTERIOR wall location must have a 3/4" spacer between thermostat and exterior wall.
 5. Follow manufacture's installation instructions provided with thermostat.

OPERATING INSTRUCTIONS

WARNING FIRE OR EXPLOSION

Do not operate furnace while vehicle is in motion or being towed.

- During initial firing of this furnace, a burn-off of excess oils remaining from manufacturing process may cause smoking or fumes for 5-10 minutes.
- NOTE: if furnace should lock out, the blower will go off in 3 minutes and remain off until unit is reset by reactivating the thermostat.

STOP! Read Users Information Manual supplied with furnace.

1. Turn the manual valve (if so equipped) or the valve at the outside LP tank to the "OFF" position. Do not force.
2. Set thermostat above room temperature to begin blower operation. A slight delay will occur before the blower comes on. Allow blower to run for 1 minute for combustion chamber purge cycle. If blower does not come on or stops before ignition cycle, go to shut down and contact your dealer or a local recreational vehicle service agency.
3. After 1 minute, move thermostat lever below room temperature. Blower will remain on. Wait approximately 2 minutes for blower to go off.
4. Open manual shut-off valve (if so equipped) or the valve at the outside LP tank. Correct operation characteristics depend on the valve being positioned fully open. Never attempt to operate with a valve partially closed. NOTE: This furnace is equipped with a valve shut-off switch with switch in "OFF" position. Gas will not flow to burner nor will the furnace operate. Turn switch to "ON" position.
5. Set thermostat level to desired setting. If set above room temperature, blower will come on.
6. Allow 30 seconds for main burner to light after blower comes on. This furnace is equipped with an ignition device which automatically lights the burner. DO NOT try to light the burner by hand.
7. If burner does not light, repeat Steps 1 through 7.
8. If after three (3) attempts with no ignition, go to shut down and contact your dealer or a local recreational vehicle service agency. Do not continue to cycle furnace through thermostat in an attempt to get ignition. NOTE: If furnace should lock out, the blower will go off in 3 minutes and remain off until unit is reset by reactivating the thermostat.

TO SHUT DOWN

- 1. Set the thermostat to lowest setting, then move lever to "OFF" position.
- 2. Turn manual shut off valve (if so equipped) to the "OFF" position. Do not force.

IGNITION CONTROL DIAGNOSTIC CODES

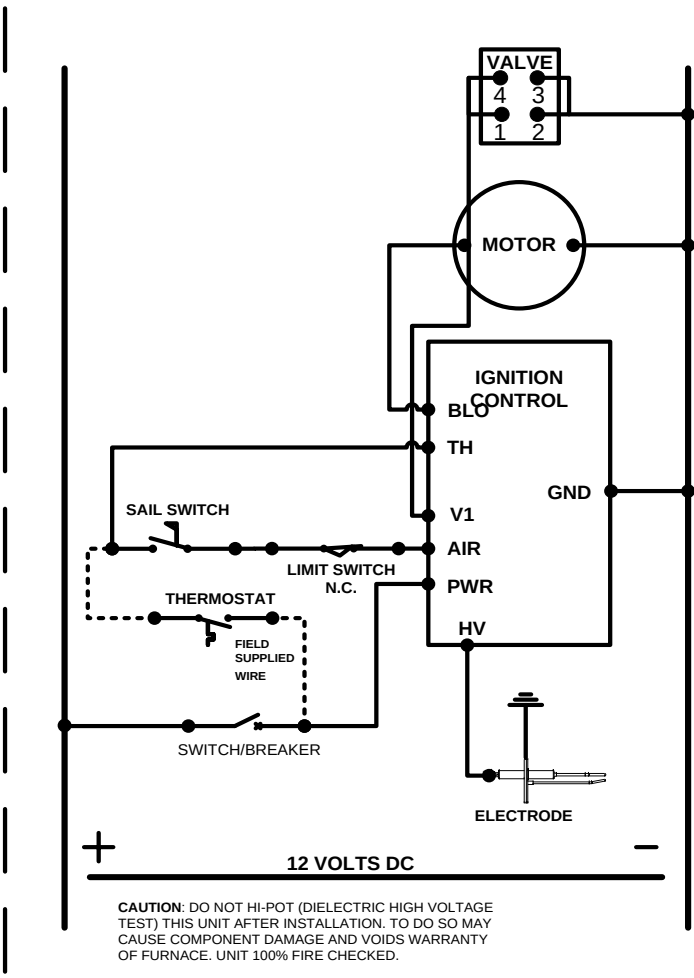
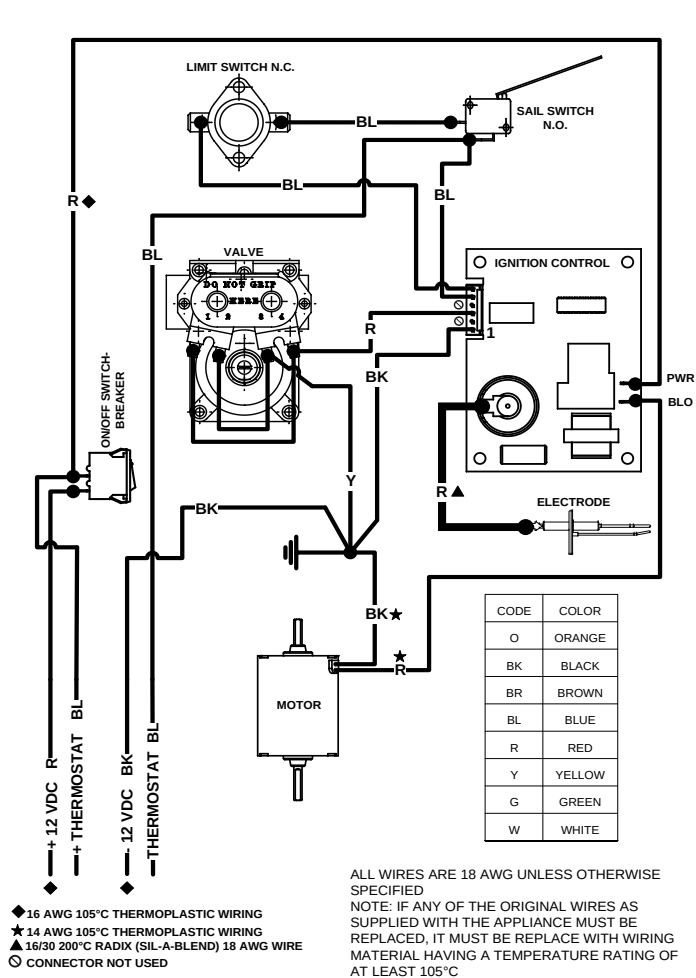
The following charts give the diagnostic codes given by the ignition control when faults are present.

- A soft lockout is a condition that is timed and will make additional attempts to correct the problem. A hard lockout requires resetting of the thermostat or turning the power switch off, then back on.

Standard 3 tries for Ignition Controls

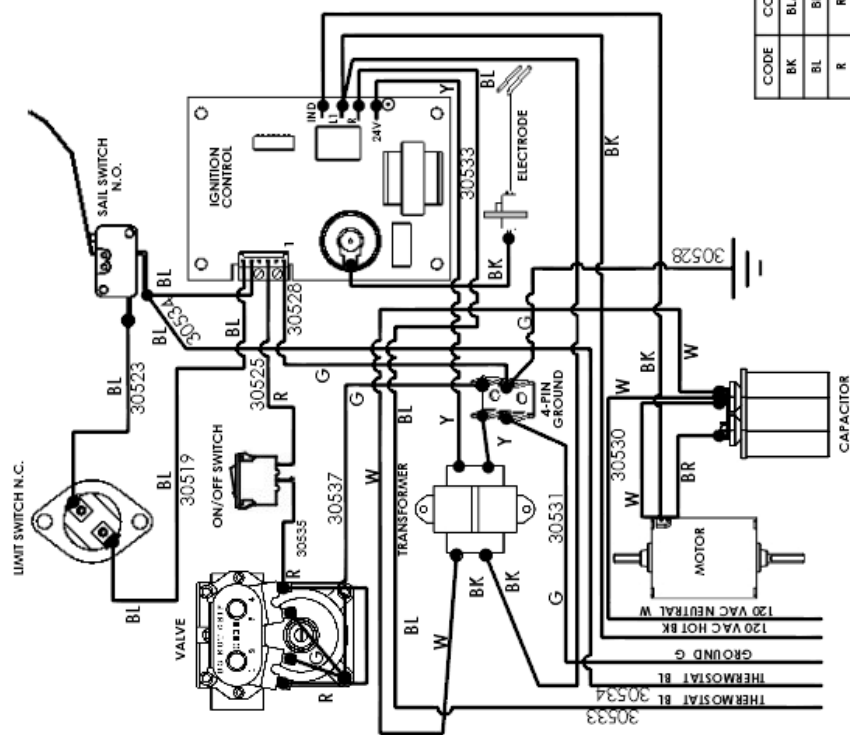
DIAGNOSTIC CHART		
FAULT	LED INDICATION	LOCKOUT
Internal Circuit Board Failure	Steady On, No Flashing	Hard
Limit Switch/Airflow Problems	1-Flash With 3-Second Pause	Soft
Flame Sense Fault	2-Flashes With 3-Second Pause	Hard
Ignition Lockout Fault	3-Flashes With 3-Second Pause	Soft (after 1 hour)

WIRING DIAGRAMS



AFLD35, AFLD40 WIRING AND LADDER DIAGRAMS

AFLA35, AFLA40 WIRING AND LADDER DIAGRAMS

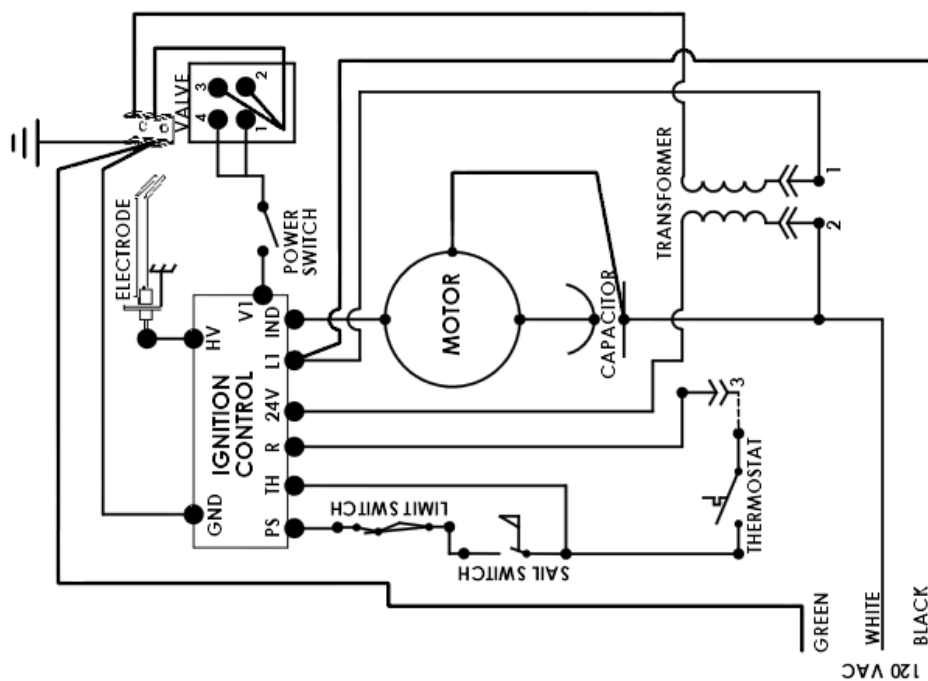


ALL WIRES ARE 18 AWG 105° C THERMOPLASTIC RATED UNLESS OTHERWISE SPECIFIED.
NOTE: IF ANY OF THE ORIGINAL WIRES AS SUPPLIED WITH THE APPLIANCE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105° C.

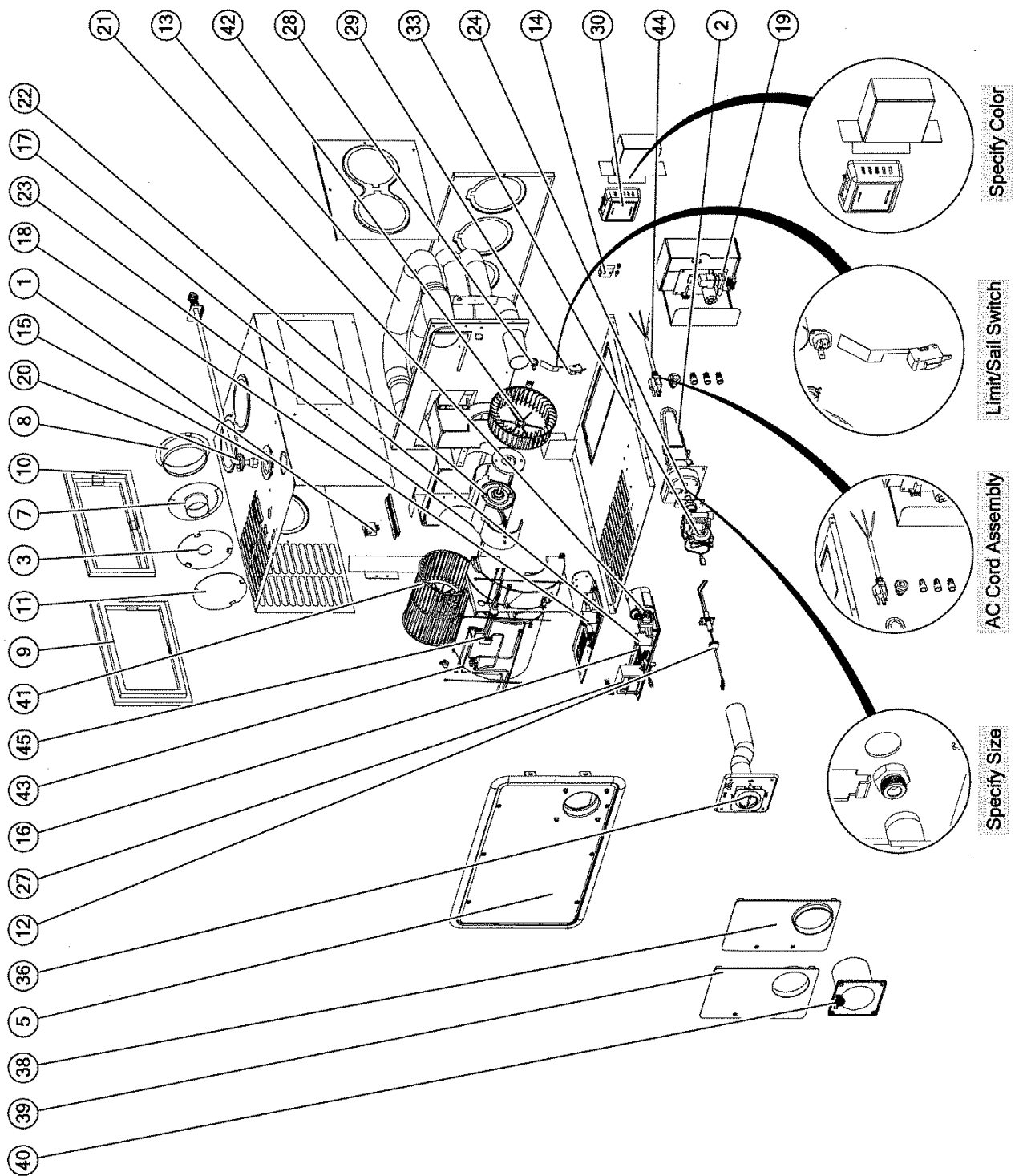
CODE	COLOR
BK	BLACK
BL	BLUE
R	RED
Y	YELLOW
W	WHITE
G	GREEN
BR	BROWN
O	ORANGE

18 AWG 105° C THERMOPLASTIC WIRING

⊗ CONNECTION NOT USED



CAUTION: DO NOT HI-POT (DIELECTRIC HIGH VOLTAGE TEST) THIS UNIT AFTER INSTALLATION. TO DO SO MAY CAUSE COMPONENT DAMAGE AND VOIDS WARRANTY OF FURNACE. UNIT 100% FIRE CHECKED.



AFL Service Parts

Category	P/N	Description	NS=PART NOT SHOW	AFL35211	AFL40211	AFL35111	AFL40111	AFL35221	AFL40221	AFL35121	AFL40121	AFL35231	AFL40231	AFL35131	AFL40131	Ballon
Breaker, Circuit																
	34015	CIRCUIT BREAKER/ON-OFF SWITCH		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	1
	32345	KIT, C/B/ON-OFF SWITCH		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	1
Burners																
	30209	KIT, BURNER HEAD LP/NAT GAS		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	2
	31089	KIT, COMBUSTION AIR RESTRICTOR		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	3
Doors																
	31845	KIT, DOOR L-F #34 ARTIC WHITE		☒	☒	☒	☒	☐	☐	☐	☐	☒	☒	☒	☒	5
	31861	KIT, DOOR L-F #44 BLACK		☒	☒	☒	☒	☐	☐	☐	☐	☒	☒	☒	☒	5
Ducting																
	36688	ADAPTER,DUCT,2 INCH		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	7
	31474	ADAPTER,DUCT,4 INCH		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	8
	30205	KIT, ADAPTER PLATE SIDE DISCH		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	9
	30261	KIT, BOTTOM PLATE ADAPTER ASM		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	10
	31361	PLATE, DUCT COVER, 4 INCH		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	11
Electrode																
	35100	KIT, ELECTRODE ASM SML		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	12
Elements																
	35707	KIT, HEAT EXCHANGER L		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	13
General Parts																
	31244	KIT, CASING LEG		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	14
	35706	KIT, GAS LINE GROMMET		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	15
Igniton, Controls																
	31243	KIT, BRACKET, AC DSI L		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	16
	30621	KIT, DSI BOARD AFL AC		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	17
	32354	KIT, DSI BOARD AFL AC SMT		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	17
	30627	KIT,DSI BOARD AFL DC		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	18
	32352	KIT,DSI BOARD AFL DC SMT		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	18
	31501	KIT,UNIVERSAL IGNITION DC		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	19
	32353	KIT,UNIVERSAL IGNITION DC SMT		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☐	☒	14
Manifold																
	35712	KIT, MANIFOLD EXT ASM SML		☐	☐	☐	☐	☒	☒	☒	☒	☒	☒	☒	☒	20
Motors																
	34039	CPCTR,4UF 370VAC 10%		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	21
	30710	KIT MOTOR AC AL35-40		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	22
	30720	KIT, MOTOR L35-40 M35		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	23
Orifices																
	30861	KIT, ORIFICE #30 NAT		☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	24
	30887	KIT, ORIFICE #48 LP		☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	24
	31077	KIT, ORIFICE #49 LP		☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	24
	31078	KIT, ORIFICE #50 LP		☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	24
	31080	KIT, ORIFICE #51 LP		☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	24
	31088	KIT, ORIFICE 3.0MM LP		☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	24
	30216	KIT,CONVERSION 35K LA		☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	☐	NS
	30219	KIT,CONVERSION 40K LA		☐	☒	☐	☐	☐	☒	☐	☐	☐	☒	☐	☐	NS

AFL Service Parts

Category	P/N	Description	NS=PART NOT SHOW	AFL35211	AFL40211	AFL35111	AFL40111	AFL35221	AFL40221	AFL35121	AFL40121	AFL35231	AFL40231	AFL35131	AFL40131	Ballon
Power Supplies																
	31095	KIT, TRANSFORMER AC		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	27
Switches																
	31092	KIT, SWITCH ON/OFF		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	NS
Switches, Limit																
	31091	KIT, LIMIT SWITCH 190		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	28
Switches, Sail																
	31094	KIT, SAIL SWITCH SML		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	29
Thermostats																
	32300	THERMOSTAT,HEAT ONLY,BLACK		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	30
	38452	THERMOSTAT,HEAT ONLY,BROWN		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	30
	38453	THERMOSTAT,HEAT ONLY,WHITE		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	30
Valves																
	31098	KIT, VALVE 12VDC TOP SML		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	33
	31099	KIT, VALVE 24VAC TOP LA		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	33
Vent, Exhaust																
	31777	KIT, DOOR VENT ASM .875 V4		☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	37
	31812	KIT, DOOR VENT ASM .930 V4		☒	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	37
	31809	KIT, DOOR VENT ASM 1.10 V4		☐	☒	☐	☒	☐	☐	☐	☐	☐	☒	☐	☒	37
	30582	KIT, LD VENT .875 V3		☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	37
	31271	KIT, LD VENT .875 V4		☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	37
	32299	KIT, LD VENT .875 V4 LW		☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	37
	30937	KIT, LD VENT .875 V4 MW		☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	37
	32332	KIT, LD VENT .93 V4 LW		☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	37
	30584	KIT, LD VENT .930 V3		☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	37
	31274	KIT, LD VENT .930 V4		☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	37
	31273	KIT, LD VENT 1.10 V4		☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	37
	32311	KIT, LD VENT 1.10 V4 LW		☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	37
	30940	KIT, LD VENT 1.10 V4 MLW		☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	37
	30583	KIT, LD VENT 1.100 V3		☐	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☐	37
	30457	VENT PANEL EXTENSION SML V3		☐	☐	☐	☐	☒	☒	☒	☒	☐	☐	☐	☐	39
	30611	VENT PANEL EXTENSION SML V4		☐	☐	☐	☐	☒	☒	☒	☒	☐	☐	☐	☐	40
Wheels																
	33126	KIT, BLOWER WHEEL & CLAMP		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	39
	30619	KIT, COMBUSTION WHEEL L		☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	40
Wiring																
	31123	KIT, AC WIRING HARNESS L		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	41
	30623	KIT, CORD ASM AFL		☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	42
	31114	KIT, DC WIRING HARNESS		☐	☐	☒	☒	☐	☐	☒	☒	☐	☐	☒	☒	43

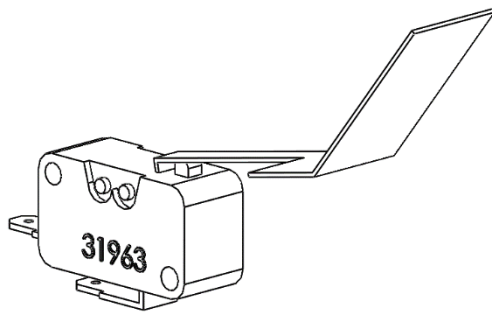


Figure 1 Small Paddle Kit 31094

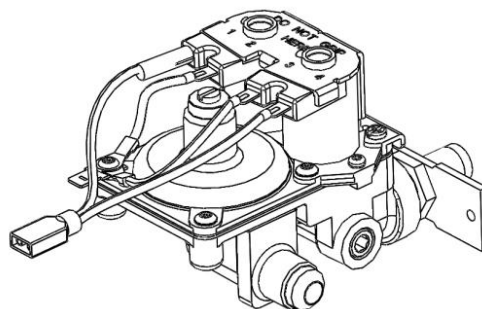


Figure 2 Valve Kit 31098

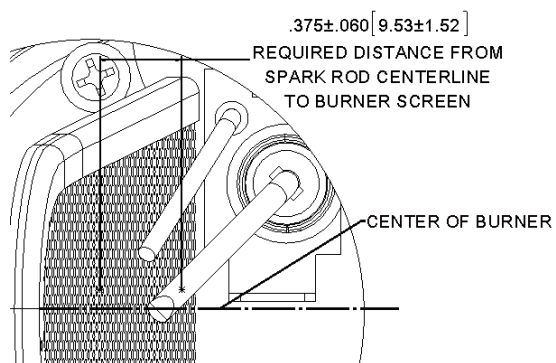


Figure 3 Electrode Adjustment